Notes on Conference with Mr. Anton Smitt, Norwegian Forester (Amtskogmester), of Stavanger, Norway.

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Notes on Conference with Mr. Anton Smitt, Norwegian Forester (Amtskogmester), of Stavanger, Norway.

Mr. Smitt visited District 1 in an effort to obtain native trees suitable to Norwegian sites. He worked entirely with comparisons of mean monthly temperatures between Norwegian weather stations and Montana stations, and drew curves to facilitate this comparison. Temperature, he says, is the most important factor in tree distribution, and moisture only secondary. He believes we should try to improve our species in planting by obtaining seed from trees at a little lower altitude, and from a little better soil than are found on the sites we wish to plant, to obtain the advantage of better size and growth. The difference in temperature can not be very great, however, or the trees can not adapt themselves to the new situation. Comparative temperature curves should be worked up, so far as weather data is available, for our own use in seed collection, by comparing the temperatures of sites from which we gathered seed, and those on which we wish to plant.

Seed Collection

The Norwegians practise seed selection by obtaining seed on timber sales only from the best individual trees. To illustrate his point, - when we were on the Bitterroot he pointed to two yellow pine trees growing side by side in the open, both the same age, but one a tall, rapidly growing black Jack, and the other a rapidly tapering, knotty, short yellow bark pine. The ages were determined with an increment borer.

In selecting a site for seed selection, the difference between the mean annual temperature of the planting site and the place of seed collection should not exceed three degrees centigrade. By selecting seed in the Bitterroot at 4,500 feet, and growing them in Norway at 1,000 feet, he believes that the difference in latitude will equalize the difference in elevation.

Seed is graded, and hollow seed removed, by throwing it on the floor with a sweeping motion, the heavy seed going farthest away from them, and the light seed remaining close to them.

Mr. Smitt says that we can depend entirely upon Mr. Johannes Rafn of Copenhagen. He is not a common seed dealer, but is an experimenter himself, and knows the

value of obtaining accurate data for seed sold. He suggests that we buy Pinus cembra through him.

Planting

Spacing used in Norway is 4 x 4 feet for all species, since there is an excellent market for thinnings. Their trees are all grown on short rotation, and are cut when they will make a 22-foot log, 9 inch top diameter. At this age they obtain the greatest financial return, because of a slight decrease in growth beyond this size, and ascending interest charges on the investment.

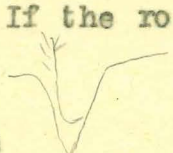
Norway spruce in Norway occupies the southern exposures in preference to the northern ones, the Norway pine by preference taking the north slopes.

Western Norway has from 60 to 80 inches of rainfall. Eastern Norway, 18 to 20 inches.

Norway spruce seed obtained from Eastern Norway can readily be adapted, he believes, to Distfict 1 sites on sites intermediate between white pine and yellow pine, upon which we now often plant yellow pine. Mr. Smitt has promised to obtain some of this seed for us. He also recommends Pinus cembra, an excellent white pine native to the

dry Russian steppes. It has been planted very successfully in Norway, and makes remarkable growth which is entirely independent of the yearly variation in rainfall. This tree will also be admirably suited to sites intermediate between yellow pine and white pine.

Mr. Smitt says that we can not always tell the true range of trees. Some trees, he believes, have a larger range than is shown through distribution. For instance, if we take pine and spruce growing side by side in Germany, and plant them side by side in Norway, the spruce will equal the native growth, and the pine will not do well at all. His theory is that pine, being an older species, has established it optimum range limits, but that spruce, being a younger species, is still extending its range. He believes that larch and Douglas fir have a much larger range than their distribution indicates.

The Norwegians have given up the practice of hurrying their planting operations. They have learned from experience that rapid planting does not pay. If the roots are curled in the hole slightly like this  they have learned that at 12 years of age the trees work loose in the soil and blow over. The reason is that the roots do not develop on the opposite side, nor will these crooked roots grow any deeper.

They use a long-handled grub-hoe with a blade 3 inches wide and 9 inches long, and a two-man crew, which averages, to plant, about 300 trees per man per day.

In planting on steep hillsides they never plant against the upper end of the hole, but always on the lower end or at the side, to prevent the soil from sliding down against the tree.

For fall planting they always use large trees, because of frost heaving.

They plant in August between the two periods of growth. The ground does not freeze until Christmas.

The buds of pine mature much earlier than spruce, and pine should be planted first.

Thinning in their plantations is done from 16 to 25 years after planting. Fail spaces are filled in three or four years after planting, when five and six year old spruce is used.

They average about 90 per cent success from their planting, sometimes running up to 97. More success is obtained with 1-1 stock than with 1-2, because the top overbalances the root in the 1-2 age class.

Even on the driest site they use the youngest stock, because the old age-classes dry out fastest.

Their areas are mapped only after their plantations are considered successful, that is, in three or four

years after planting.

Their oldest planting dates back to 1862.

They never inspect their plantations the first year, since they get the majority of their losses in the second year. The loss in the third year, however, is practically nil.

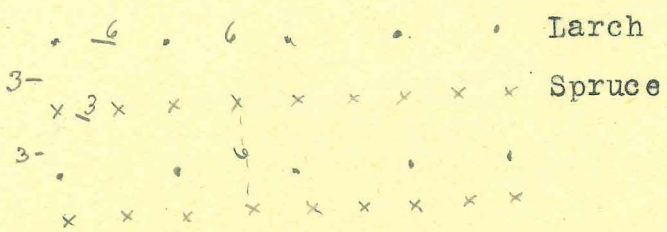
They use about 6 M. trees per hectare (2½ acres), - cost, $12 for labor and $12 for planting, - Total - $24.

They often plow the land following logging operations, to obtain reproduction from the seed trees left. This costs about $20 per hectare. The advantage of this method is that they get all age classes in their reproduction.

Natural reproduction will prune itself much earlier than planted trees.

In reply to my question as to whether or not he thought we were spacing our trees correctly, considering that we have no market for thinnings, he said he thought we were doing all right, unless (1) we could get a girdling machine for thinning out areas at little expense, or (2) plant cedar with our white pine some time during the next ten years.

In Norway they sometimes plant larch 6 x 6, and ten years later plant spruce as follows:



Mr. Smitt believes there is a wonderful future market for Abies, and that we should plant it at our higher elevations.

They have a great deal of trouble in Norway with grouse picking off the buds. Grouse injury can be distinguished from rabbit injury because rabbits will take half of the top.

The dearest planting, he says, is always the cheapest. He says that we should plant with the hands entirely, and that we are making a mistake by tamping with a mattock. By our method of planting we will invariably get curled roots, and the soil will be hard on the edges, thus preventing the rapid expansion of lateral roots. By their method the dirt is removed entirely, and only loose earth, with sticks and debris removed, returned to the hole.

He believes our mattock is too narrow, but otherwise all right. We need more room for the hands in the holes we dig.

They pay their planters - boys, 30 to 35 cents per day of 10 hours, and for men, from $1.00 to $1.30 per day, without board.

Mr. Smitt believes that just because white pine will not grow naturally above 4,500 feet, it is no sign that it can not be made to grow there.

The bulk of the planting in Norway is done on private land under Government control. In his district alone there are 18,000 farms. Norway will not tolerate private nurseries. The Government undersells them purposely to put them out of business, because they can not be made to sell the proper kind of stock. The Government will not tolerate timber speculators, and all the timber sold is scaled by Government scalers. The Government raises some ornamental stock simply to help along their other costs.

Their experiment stations are supported one-half by the Government and one-half by private individuals.

Very few experiments in nursery practice are being carried on now, although it is a burning question.

When direct seeding is used, hundreds of spring

traps are set on the area to catch the mice. They bait them with bread and fat pork.

Nursery Practice

Sowing.

Pine is all broadcasted; spruce sown in drills. Reason for drills, - even development two years in the drills. Broadcasting results in too close spacing for spruce. Pine is broadcasted because it is left in the seed bed only one year. The following age classes are used:

Pine ----- 1-1

Spruce --- 2-1 - Sometimes 2-2.

Avoid 2-2 if possible because too much top in proportion to root. Never use 1-2 pine, because the top over-balances the root.

The Norwegians believe that the more money they put on the nursery stock, the cheaper it is in the long run. They have given up cheap work entirely.

They always sow pine and spruce in the spring at the nursery, and larch and Abies in the fall, as well as the hardwoods.

Fertilizing, - manures in preference to bone meal and fish, kainit and other commercial fertilizers.

They have no diseases worthy of mention.

They fallow with potatoes and lupine.

Their plantations are often fertilized with commercial fertilizers until they are 15 years old, using kainit, nitrate of soda, and saltpeter.

For shade in nursery practice light canvas is used, 25 to 30 yards long, which can be rolled up on the top of the shade frames. They only use shade until all the seed has germinated, and then take it off.

Their beds are flat, and the sand is not rolled after it is applied, but they keep it as loose as possible. No water is used on the beds at any time.

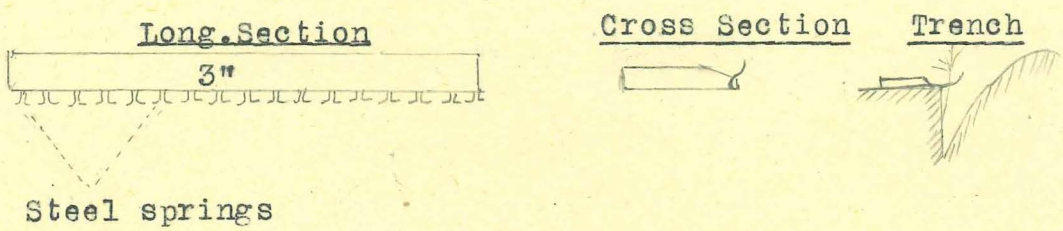
They have no damping off whatever.

They have done no root pruning in place.

They store their stock against advanced growth, for transplanting in the field, with ice and moss between the layers of the roots.

Their transplant board is 4 feet long, with 32 notches for spruce and 48 for pine. This spacing has been correctly determined by a long series of experiments. Their

transplant beds are laid out as in District 6. The distance between the transplant rows is 3½ inches. Their transplant board is made as follows:



Their transplanting is done by women. The unit crew consists of one digger and one threader. They average 4 M. per day each, - pay, $1.00 for the digger, and 3 cents per hour for the girl who does the threading, or 30 cents per day.

Their largest nursery has a capacity of 3 million trees annually.

They grow from 12 to 14 million trees in Norway every year.

Their stock is taken up with a spading fork, and ~~their stock~~ is done up in bunches of 50 or 100.

They cull both the seedling and transplant stock very heavily, it often running as high as 25 per cent.

For packing the trees they use simply a large piece of canvas or burlap, lay roots to the center, with ice and moss on top, and then gather up the edges and sow

them with a sack needle. A very detailed letter is sent with each shipment of stock to the recipient, telling how to plant.

Weeds are killed in the nurseries by laying down boards between the beds and later taking them up. Boards 3½ inches wide are also used between the transplant rows, to keep out the weeds. Salt is very dangerous, and will stay in the ground for several years, preventing its use for other purposes.

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